

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

TO: Mr. Edson G. Case		FROM: Duke Power Company Charlotte, North Carolina William O. Parker, Jr.		DATE OF DOCUMENT 5/2/77
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DESCRIPTION

Ltr. consisting of info. pertaining to the manner in which the postulated effect of rod bow on DNBR is factored into the thermal-hydraulic performance requirements of future reload fuel cycles....

DO NOT REMOVE

(2-P)

PLANT NAME:
Oconee Units 1-2-3

RJL

ENCLOSURE

ACKNOWLEDGED

SAFETY		FOR ACTION/INFORMATION		ENVIRO	
ASSIGNED AD:				ASSIGNED AD:	
BRANCH CHIEF:	<i>Schwencer (5)</i>			BRANCH CHIEF:	
PROJECT MANAGER:	<i>Neighbors</i>			PROJECT MANAGER:	
LIC. ASST. :	<i>Sheppard</i>			LIC. ASST. :	

INTERNAL DISTRIBUTION			
<input checked="" type="checkbox"/> REG FILE	SYSTEMS SAFETY	PLANT SYSTEMS	SITE SAFETY &
<input checked="" type="checkbox"/> NRC-PDR	HEINEMAN	TEDESCO	ENVIRO ANALYSIS
<input checked="" type="checkbox"/> I & E (2)	SCHROEDER	BENAROYA	DENTON & MULLER
<input checked="" type="checkbox"/> OELD		LAINAS	
<input checked="" type="checkbox"/> GOSSICK & STAFF	ENGINEERING	IPPOLITO	ENVIRO TECH.
MIPC	MACARY	KIRKWOOD	ERNST
CASE	BOSNAK		BALLARD
HANAUER	SIHWEIL	OPERATING REACTORS	SPANGLER
HARLESS	PAWLICKI	STELLO	
			SITE TECH.
PROJECT MANAGEMENT	REACTOR SAFETY	OPERATING TECH.	GAMMILL
BOYD	ROSS	EISENHUT	STEPP
P. COLLINS	NOVAK	SHAO	HULMAN
HOUSTON	ROSZTOCZY	BAER	
PETERSON	CHECK	BUTLER	SITE ANALYSIS
MELTZ		GRIMES	VOLLMER
HELTEMES	AT & I		BUNCH
SKOVHOLT	SALTZMAN		J. COLLINS
	RUTBERG		KREGER

EXTERNAL DISTRIBUTION			CONTROL NUMBER
<input checked="" type="checkbox"/> LPDR: <i>Wahlberg, SC</i>	NAT. LAB:	BROOKHAVEN NAT. LAB.	<i>[Signature]</i> 771260223
<input checked="" type="checkbox"/> TIC:	REG V. IE	ULRIKSON (ORNL)	
<input checked="" type="checkbox"/> NSIC:	LA PDR		
<input checked="" type="checkbox"/> ASLB:	CONSULTANTS:		
<input checked="" type="checkbox"/> ACRS / 6 CYS HOLDING / SENT <i>AS CAP B</i>			

DUKE POWER COMPANY

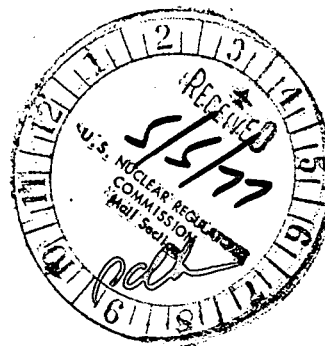
POWER BUILDING

422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

TELEPHONE: AREA 704
373-4083

May 2, 1977



Mr. Edson G. Case, Acting Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. A. Schwencer, Chief
Operating Reactors Branch #1

Re: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

REGULATORY DOCKET FILE COPY

Dear Mr. Case:

The following information pertains to the manner in which the postulated effect of rod bow on DNBR is factored into the thermal-hydraulic performance requirements of future reload fuel cycles of Oconee Units 1, 2, and 3 and is submitted in response to your letter of March 25, 1977.

On September 17, 1976, Babcock & Wilcox Company (B&W) submitted to the NRC (letter of K. E. Suhrke to D. F. Ross) an interim rod bow evaluation for the Mark B fuel assembly design representative of Oconee fuel. This interim evaluation is based on extensive bow measurements performed on irradiated fuel assemblies from Oconee Unit 1 discharged after end-of-Cycle 1 and end-of-Cycle 2. A correlation relating the magnitude of bow and fuel assembly burnup was obtained in the same form as that by the NRC. The empirical constants of the correlation were adjusted to encompass the cold-to-hot adjusted measured data at the 95 x 95% upper tolerance limit. The resulting equation for the maximum rod bow magnitude is $\sigma_b(\text{mils}) = 11.5 + 0.069 \sqrt{\text{Bu}}$. The rod bow DNBR penalty assigned for future reload fuel cycles of Oconee units is consistent with this bow equation and results in a DNBR penalty of approximately 6% for fuel burnups equivalent to three cycles of operation.

The thermal-hydraulic design analyses of future reload cycles are based on closed vent valve configuration and without the effect of densification power spike on DNBR but including the customary flow area reduction factor. Thus, considering 1% DNBR margin credit for the flow area reduction factor, the additional thermal margin to be provided for rod bow DNBR penalty is 5%. The procedure now employed for future reloads, in general, is to

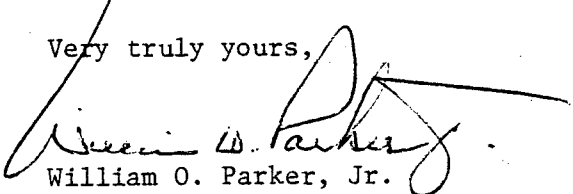
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Mr. Edson G. Case
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explicitly provide a minimum of 5% DNBR margin in the design analyses that establish the RPS setpoints based on minimum DNBR requirements - that is, those setpoints previously based on a minimum DNBR of 1.3 would now be based on a minimum DNBR of 1.365 (1.05×1.3). An exception to this would be the flux-flow ratio for Cycle 3 of Units 2 and 3 wherein thermal margin credit for 1-3% excess RCS flow will be claimed to demonstrate the required DNBR margin. (The RCS flow for Units 2 and 3 are 111.5% and 110%, respectively, compared to thermal design flow of 106.5%.) It should be noted that the actual setpoints would have varying degrees of additional thermal margin.

The procedure described above represents the manner in which the rod bow DNBR penalty is accounted for in the upcoming Cycle 4 of Unit 1 or Cycle 3 of Units 2 and 3, and unless otherwise stated, this procedure would be used for all future reloads of Oconee units.

Very truly yours,


William O. Parker, Jr.

PMA:vr